

## CHALCIDOIDEA BRED FROM *GLOSSINA MORSITANS* IN NORTHERN RHODESIA.

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In connection with investigations into the life-history, etc., of *Glossina morsitans* in Northern Rhodesia, special efforts have recently been made to secure parasites of the fly. As a result, a considerable number of Chalcidoids have been bred from puparia collected between August and December of last year at Kashitu (*Ll. Lloyd*) and Mwengwa (*R. A. F. Eminson*). These interesting Hymenoptera have now been forwarded to the Imperial Bureau of Entomology by Mr. Lloyd, Chief Entomologist in Northern Rhodesia, with the parasitised puparia and some relevant notes. On this material the present report is based. The collection contains three species, representing as many widely separated groups in the superfamily Chalcidoidea. Two believed to be new are described below, the types being deposited in the British Museum.

### Family CHALCIDIDAE.

#### Genus STOMATOCERAS, Kirby (1883).

*Stomatoceras*, Kirby, Journ. Linn. Soc. Lond., xvii, no. 98, p. 62, Pl. iv, figs. 21–23 (1883).

Genotype\* *Halticella*† (sic) *liberator*, Walker, Trans. Ent. Soc. Lond. (3) i, p. 361 (1862).

In erecting *Stomatoceras*, Kirby failed to note the characteristic armature of the propodeon.‡ This omission he later supplied (Journ. Linn. Soc. Lond., xx, no. 116, p. 36, 1886); nevertheless, Ashmead (Mem. Carneg. Mus., p. 255, 1904) includes *Stomatoceras* in the section of the HALTICHELLINAE in which the “metathorax” (i.e., propodeon) is “normal, without projections,” and in this error he is apparently copied by Schmiedeknecht (Wytsman’s Genera Insectorum, Chalcididae, p. 49, 1909). Schulthess (Bull. Soc. Vaud. Sc. Nat., xxxv, p. 251, 1899) treats *Stomatoceras* as a subgenus of *Haltichella*, but the group included here deserves, I believe, full generic rank. The ♀♀ may be separated by the following characters:—

*Antennae* slender, 11 (13) jointed, the divisions of the last joint generally requiring clearing in potash for demonstration. *Scutellum* sharply bidentate, with no median furrow and differing in sculpture from the mesonotum only in the rather more closely set puncturation. *Propodeon* with one (sometimes only slightly raised) projection *before* the crescent stigma and two well developed, behind, on the ridge

\* The genotype, *Stomatoceras liberator*, Walker, in the British Museum is from Port Natal (*Guizenzius*). The eleventh joint of the left antenna (mounted in balsam) is distinctly twice divided.

† Spinola (1811) named his genus *Haltichella*; Walker wrote *Halticella*, which is preferable, but the change is inadmissible.

‡ In the Oxford Dictionary it is pointed out that Newman’s original spelling—propodeon—is the correct Latinised form of this term, and not propodeum.

between notum and pleura. *Wings* always maculate, banded or clouded, radius and post-marginal very short and sub-equal; femora with the lower edge minutely denticulate, produced besides into two or three blunt projections.

The genus is well represented in Africa.

***Stomatoceras micans*, sp. nov.** (figs. 1, 2).

Distinguished by the antennae (colour and narrowness); wings (pattern); legs (colour and armature); pubescence (colour and distribution) and first abdominal segment.

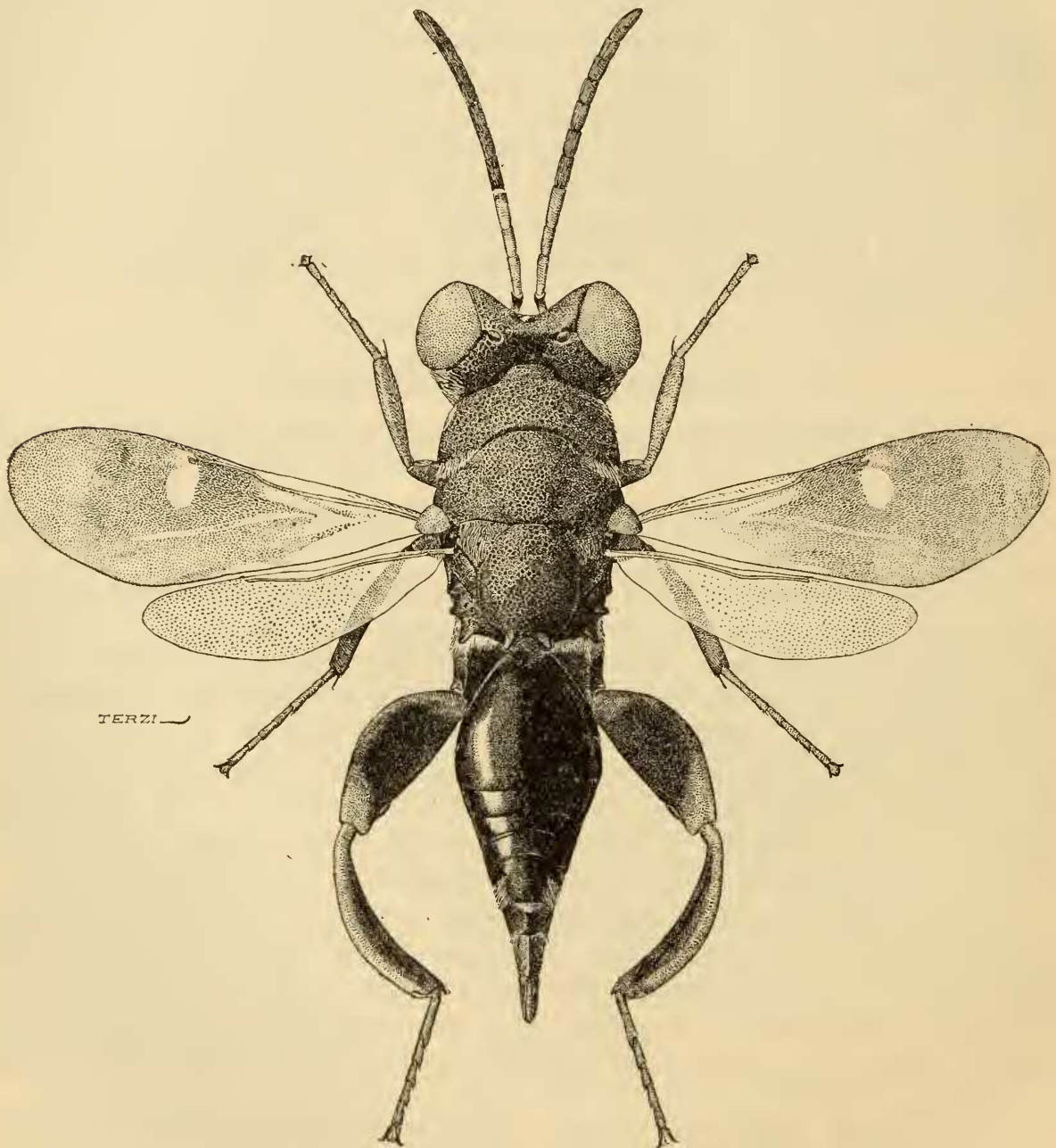


Fig. 1. *Stomatoceras micans*, Waterston, sp. n., ♀.

♀. *Head, Thorax and Abdomen* black; tegulae brown. Seventh tergite narrowly paler at base and middle of extreme apex; the upper edges of the sheath of the ovipositor blackish brown; viewed laterally, the abdomen is hardly so dark as from



above. *Legs*: fore and mid legs from coxae to apex of tibia reddish brown, tarsi lighter, rufous-flavescent; hind coxae black, apex brown; femur mainly black, with base and apex brown; tibia externally brown, with the inner edge broadly black; just before the apical spines this black band leaves the edge and terminates near the middle of the inside apical edge; the lower apical angle of the tibia brown; tarsi brown with a slight flavescent tinge, not so pronounced as in the anterior legs; claws brownish. *Antennae*: scape (darker slightly at extreme tip), pedicel, and joints 1 and 2 of funicle brown or yellowish brown; five to ten almost black; the club lighter but not so pale as the scape, etc. *Wings*: the membrane of the base up to near the origin of the marginal vein is irregularly clear, though not quite hyaline; elsewhere (save for the round clear spot at the end of the marginal vein) the wing is more or less darkly tinged. The distinctive pattern, however, is produced by the chaetotaxy (see separate account); veins brownish; hind wings hyaline. *Pubescence*: on head, prothorax (at side and along anterior edge of pronotum), axillae, propodeon (pleurae and posterior edge), hind coxae (outside), pleurae of abdominal tergites 1, 2, 3 and 6 silvery white, glistening; on the posterior edge of the pronotum and inside the parapsidal furrows rather faint yellowish; on abdominal tergites 3 (above only), 4 and 5 (entirely), 6 (medianly), 7 and 8 are fine brown hairs; on the ridges above the stylets the hairs are yellowish brown.

*Head* wide, exceeding the thorax and equalling the distance between the points of the extended tegulae; much wider than the abdomen (10:7); broadly and deeply excised on the frons and occiput, so that the vertex is reduced to a rounded ridge on opposite sides of which lie the anterior and the lateral ocelli respectively; the lateral ocelli are within their own diameter's length from the edge of the eye. The whole head (like the notum of the thorax) umbilicately punctured; the punctures on the frons finer, especially behind the scapes.

*Antennae* (fig. 2, 1) set low down, with the usual semicircular flat thin process between the scrobes; narrow and filiform, of almost the same calibre throughout. Scape (16:1), slightly swollen near the base, then narrowed till near the extreme apex, which is again expanded into two flanges to receive the pedicel. The pedicel is about equal to the second funicular joint, which is the longest in the funicle; the eleventh joint or club is on clearing very distinctly biseptate, but there are no internal articulations comparable with those existing between the other funicular joints. The proportions of the joints, excluding the scape, are:—(pedicel) 18:11:18:13:13:12:13:11:9: (club) 5:4:10. In the same ratio the width of the funicle is 6-7. Length of antennae, 2.35 mm.

*Thorax* normal in structure and sculpture; scutellar teeth sharp and wide apart; pubescence rather sparse; on *pronotum* mainly at the sides; on posterior edge broadly interrupted medianly; on the *mesonotum* the pubescence is confined to a single row along the inside of the parapsidal furrows; the axillae are completely but sparsely clothed. *Scutellum* bare. The *metanotum* is represented by two narrow, wedge-shaped sclerites with eight to ten round punctures. The teeth of the *propodeon* occur on the edge between the notum and pleura; the first before the curved stigma is short and rather blunt, the two posterior being longer. The longest pubescence occurs between the hindmost spine and the petiole; there is a scattered pubescence

also on the pleura of the propodeon above the hind coxa, and a much more compact patch on the outer basal half of the coxa itself.

*Wings* : fore wings three times as long as broad ; submarginal : marginal : radius : post marginal, 18:6:1:1 (when highly magnified the radius and postmarginal are roughly as 15:13). The submarginal vein bears about eighteen bristles from the base of the wing to the two clear transversely placed cells ; the marginal is covered with numerous scales (modified hairs) ; the radius has four cells, the last minute (fig. 2, 2). The submarginal cell has on the under side about twenty-four bristles, half-a-dozen near the base being stronger ; it is not closed, as the marginal vein does not run quite flush with the costa. Where the cell narrows there are a few short

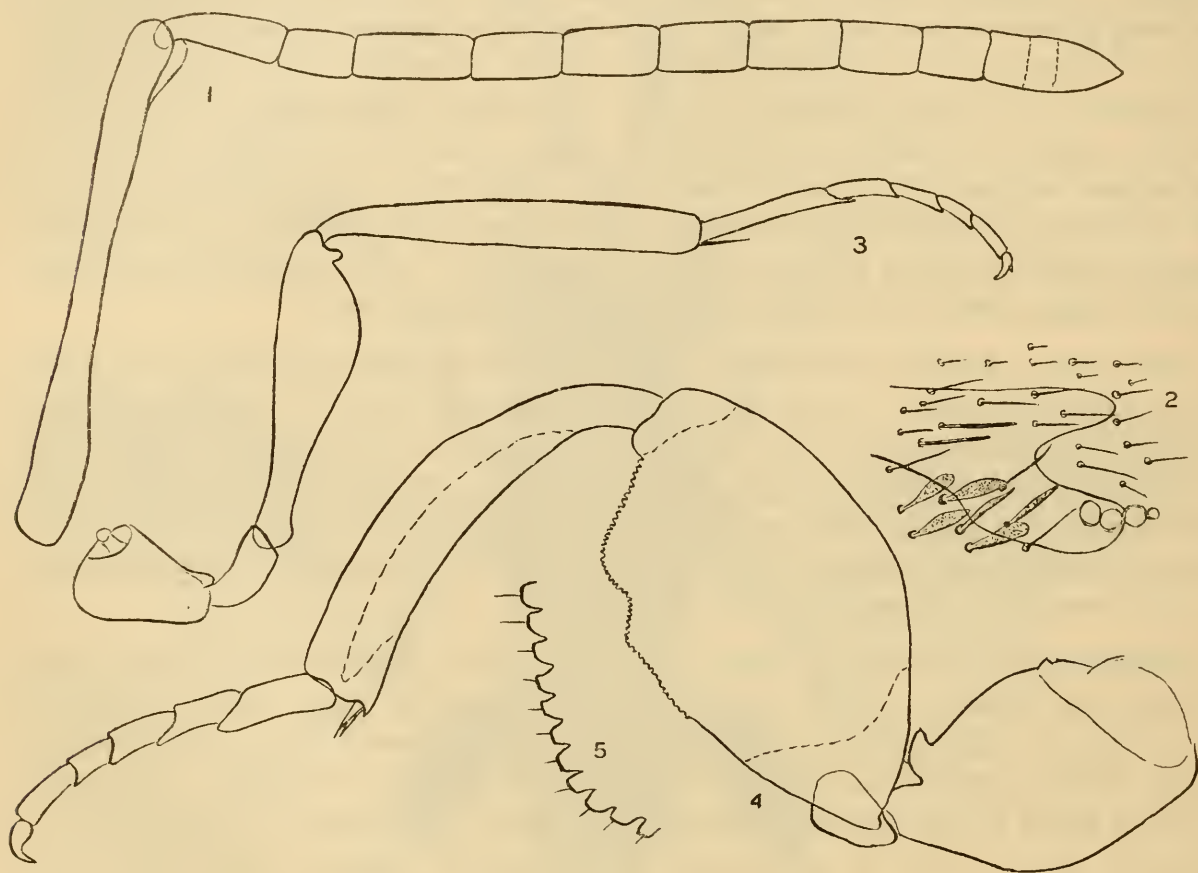


Fig. 2. *Stomatoceras micans*, ♀; (1) antenna; (2) end of marginal and radius; (3) mid leg; (4) hind leg; (5) lower outer edge of hind femur.

stout hairs, and scales above. The posterior margin of the wing from the base to nearly opposite the end of the submarginal is bare, but behind the submarginal and up to its mid point are three to five rows of hairs ; after this there is a broad < shaped, clear space, the lower arm short, while the upper extends nearly to the beginning of the marginal vein. The middle portion of the wing is occupied by a dark cloud, interrupted only by a large clear spot at the end of the radius and a clear line about twice the length of the marginal, which begins somewhat before the origin of that vein and runs (at one-third) parallel to the hind margin ; the depth of the cloud is due in part to the colour of the wing membrane (which is a little darker below the marginal) and again to the closely set, blackish brown



scales and short thick bristles. Besides these elements the chaetotaxy comprises also fine bristles (long and short) of two colours:—(a) blackish brown, clothing the apex broadly and more scattered on the under surface, and (b) quite hyaline and refringent, covering the clear spot below the radius, and giving the spot a silvery white appearance in direct light. Length of forewing, 2·4 mm.; breadth, 0·8 mm. The hind wing is about four-fifths as long as the forewing; length: breadth, 9:2.

*Legs*: the fore femur is considerably swollen and broadest before the apex; in the mid leg (fig. 2, 3) the swelling of the femur takes place abruptly after one-half; on the lower outer edge of the hind femur, which is minutely denticulate from the apex to about one-third from the base, there are on the posterior half two distinct, nearly equal prominences, and a third, less clearly marked, just before one half (fig. 2, 4, 5).

*Proportions of Tarsal Joints.*

	i.	ii.	iii.	iv.	v.	Claw.
Fore .. ..	95	55	45	40	55	25
Mid .. ..	130	65	50	40	55	30
Hind .. ..	80	75	60	50	80	45

*Abdomen* ovate and acutely pointed; the first segment is the widest and about as long as wide; it occupies rather less than half, the posterior edge lying mid-way between the insertion of the petiole and a line connecting the stylets on tergite 7. The entire surface is polished and shining, there being only a slight patch of pubescence on each of the pleurae. Second segment about as long as the fifth, and both longer than the third, while the fourth appears so much wedged in dorsally as to be reduced to a mere line in the middle; segments 6 and 7 are again long, the former slightly shorter; segment 7 is as long as segments 2 to 5 inclusive. The upper sheath of the ovipositor (tergite 8) is half as long as the seventh segment; the ovipositor does not project. After the first segment the tergites are finely raised reticulate, the pattern on tergite 6 being coarsest on the distal three-fourths; the basal one-fourth is on this tergite smooth. On the seventh tergite the stylets are placed just before one-half; their containing depressions meet indistinctly above, and from this junction a keel stretches backwards to the posterior edge. The pleurae of all the tergites (except 1 and that partially) are covered with pubescence, the units of which are stronger and refringent on segments 2, 3 and 6; elsewhere the clothing is of fine hairs which are best seen in side view; the refringent patches have a characteristic silvery gleam (see colour notes).

*Length*, about 4 mm.; alar expanse, 6 mm.

NORTHERN RHODESIA: Mwengwa, 3,200 ft., one specimen bred from a pupa of *Glossina morsitans* (R. A. F. Eminson).

*Type*—a ♀.

Mr. Eminson found the puparium from which the *Stomatoceras* was bred on 6th October, 1914, in the locality where the puparia yielding *Syntomosphyrum* occurred

(see below p. 81). The date of emergence was not noted. No other specimen nor certain evidence of the recurrence of this species was secured. The *Stomatoceras* emerged from the puparium by a large irregular hole. Although other similarly fractured pupa-cases were found, Mr. Eminson thinks that the injury might have been caused in these instances by ants.

Family ENCYRTIDAE.

Genus ANASTATUS, Motsch. (1859).

*Anastatus*, Motschulsky, Etud. Ent., viii, p. 116 (1859).

The species now described and assigned to *Anastatus* may represent a new genus. The short ovipositor and the nature of the posterior edges of the abdominal tergites preclude its being placed in *Eupelmus* or any of the nearest allies of that genus; but the species does not run down easily into any of the presently accepted divisions of the subfamily EUPELMINAE, and it is only because *Anastatus* seems to offer fewer difficulties that I place this species there.

***Anastatus viridiceps*, sp. nov.** (figs. 3, 4, 5).

♀. A pale brown insect, with darker head and banded forewings (fig. 3). *Head*: metallic green, with faint golden to coppery reflections, especially near the orbits, and on the depressed triangle between the scrobes and the anterior ocellus. Eyes purplish brown, ocelli clear. Antennae like the frons, etc., metallic green, except the scapes, which are non-metallic yellowish brown. *Thorax* and *legs* mainly clear yellowish brown. Empodia and claws darker, and a dark superior streak on mid femora, beginning at about one-third from the base and extending to the apex. The heavy spines of the mid tarsi are likewise blackish brown. The elongated mesosternum dark, metallic green. Sharply separated from the non-metallic pale pleurae, while on the notal surface all over the mid lobe and invading the lateral lobes in two narrow strips, the same metallic green coloration reappears, being strongest behind the fading ends of the parapsidal furrows, just in front of the suture, which it fails to reach. Apex of scutellum also slightly darkened and submetallic. Anteriorly the mesopleurae are covered sparsely by a glistening white pubescence. Propodeon dark, with distinct purplish metallic reflections. *Wings*: forewings mainly tinged with brown, but the submarginal cell and a transverse band from the middle of the marginal vein to the hind margin are hyaline. The apex is clear and the apical region extensively pale from about the ending of the post-marginal, but this is due in part to the lighter chaetotaxy. There is no sharp demarcation between the dark post-median and the light apical areas. Pubescence mainly brown, but round the edges of the clear median band and near the origin of the marginal is a scattered blackish pubescence, seen when the light is allowed to fall from the side. *Abdomen*: basal one-third (segments 1 and 2) semi-transparent whitish, followed by a dark median band (on tergites 3 and 4). The posterior half of the abdomen concolorous with the legs and thorax; somewhat dusky on sternites and flanks.

*Head*: eyes bare ( $\times 600$ , a few very minute hairs not exceeding the facets in height are visible near the edges), approximated on the vertex, where they are separated by about their own diameter (seen from in front) and by twice that distance below. The keel from the lower eye angle is well defined to the clypeal edge. Frons



entirely reticulate, with fine, even, much raised pattern. The bristles of the usual row along the orbits are weaker below, with only one to two stronger on the vertex. Ocelli in a nearly equilateral triangle; the posterior pair rather farther from one another than from the anterior ocellus. Posterior ocelli set near the eyes, the distance between them being twice that of either from the eyes. The scapes of the antennae lie in an elongate triangular depression with sharp lateral edges. This hollow thins out and is medianly sharply keeled towards the anterior ocellus, at which it ends.

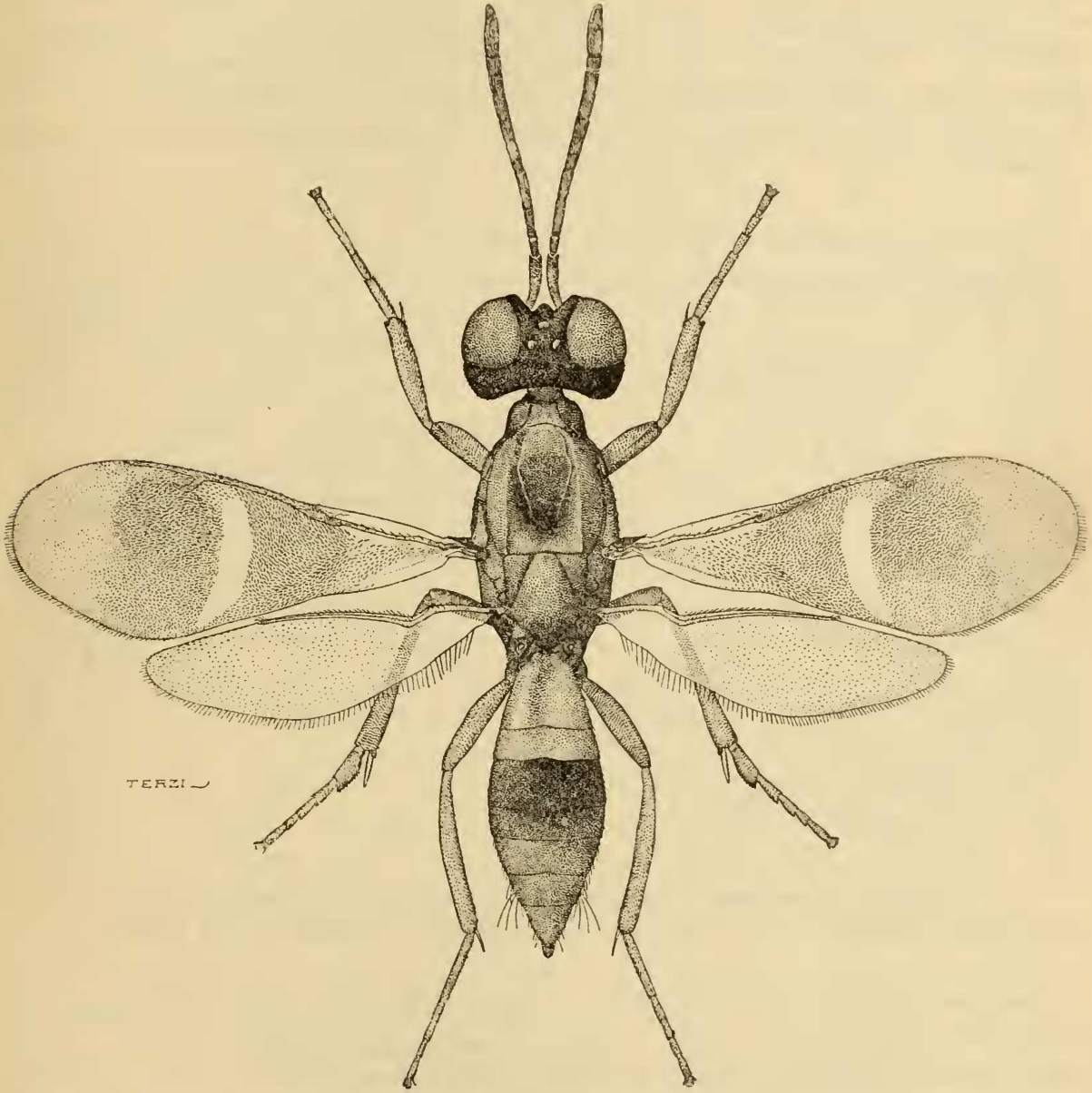


Fig. 3. *Anastatus viridiceps*, Waterston, sp. n., ♀.

The scrobes, broader than deep, rounded quadrate, with the upper inner angle slightly produced, lying one-half below the base line of the eyes. Frons, except for the orbital bristles, bare to the level of the scrobes, between which and the clypeal edge are numerous short bristles. Clypeal edge distinctly concave, with a narrow median smooth area, flanked by short ridges, bearing four hairs. No sharp occipital edge, the whole vertex being gradually rounded so that the eyes have a considerable margin behind.

*Antennae* (figs. 4, 5) with thirteen joints : scape, pedicel, eight funicular, three in club. Scape about five-and-a-half times as long as broad, rather narrow on basal third ; reticulate, with regularly distributed short hairs on either side ; one or two outer subapical median bristles stronger. Pedicel two-sevenths of the scape and twice as long as broad. From the first funicular joint to the middle of the club the antenna is steadily expanded. The third joint (first funicular) is a little narrower (3 : 4) than the pedicel and half the width of the tenth joint, while the club at its widest exceeds the third as 5 : 2. The segmentation of the club is obliquely undulated, not circular and transverse. The last joint obliquely truncated, with a membranous termination, which forms a large sense organ. The proportional lengths of the antennal joints from 3 onwards are 13 : 37 : 34 : 40 : 30 : 30 : 28 : 26, and of club 27 : 23 : 25, measured along the ventral edge. The second funicular joint (4) bears no sensoria.

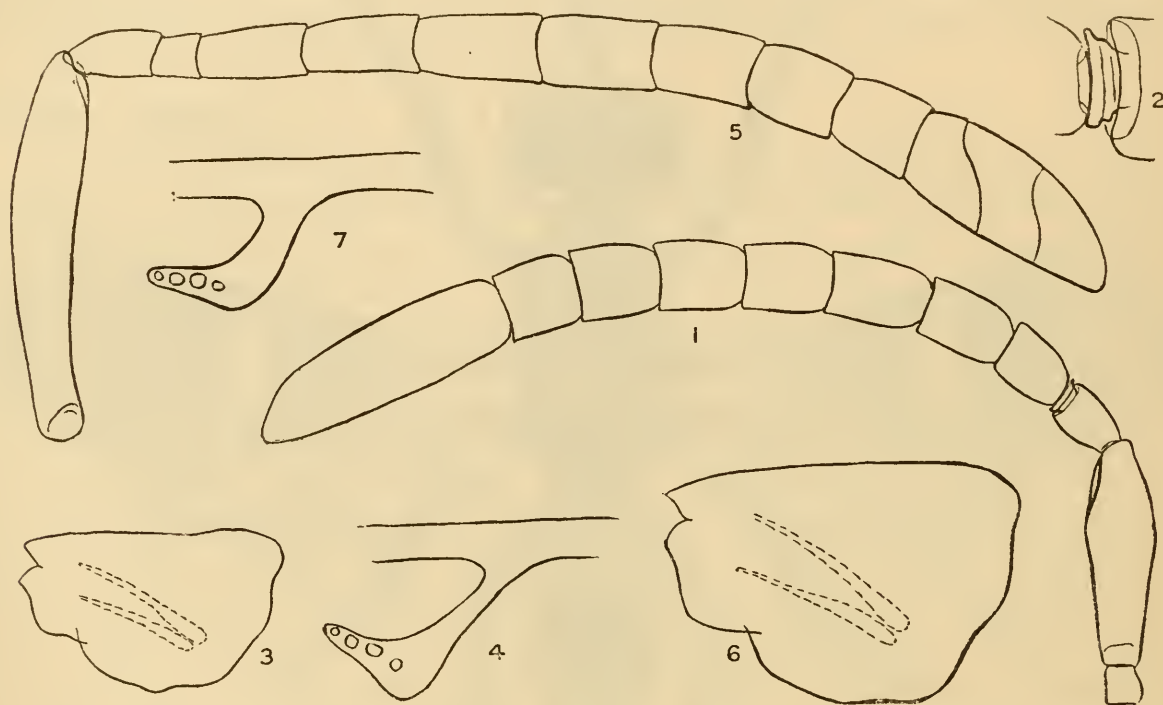


Fig. 4. *Anastatus viridiceps* : ♂.—(1) antenna ; (2) ring joint ; (3) mandible ; (4) radius. ♀.—(5) antenna ; (6) mandible ; (7) radius.

*Mouth-parts* of the usual Eupelmine type. Labrum small, co-extensive with the smooth median area of the clypeus ; bearing eight bristles. First maxilla, both stipes and mentum strongly reticulate ; the former with one to two superficial and four lateral bristles. Maxillary palpus, 11 : 12 : 16 : 35 ; the last joint darkened and apically broadened. Labial palpus, 15 : 9 : 15 ; the second joint broader than long. The teeth of the mandibles are short, the outer acute, the inner broad and obtuse (fig. 4, 6).

*Thorax* : pronotum in two sclerites, with a narrow median membranous connection. Each protergite with a few scattered bristles forming anteriorly a row of seven to eight ; two longer and two shorter bristles near the dark spiracular edging ; surface of pronotum smooth, reticulate. The rest of the dorsal thoracic surface has a rather



fine strongly raised pattern, that on the scutellum and axillae so coarse as to appear honeycombed. There is a small median presutural smooth area. The incomplete, backwardly converging parapsidal furrows fade away about the middle of the mesonotum; within them posteriorly the sculpture of the mid lobe is almost as coarse as on the scutellum. The basal sutural abscissa of the scutellum is narrow—a little more than half that of either axilla. There is practically no post-scutellum, the metanotum consisting of two narrow inconspicuous sunken and slightly roughened sclerites.

*Mesonotum* with scattered hairs at the corners of the raised cells, two short bristles at each side opposite the middle of the axillae, and one or two more on the smooth area. After the suture no scattered hairs, but four or five bristles on each axilla, three along the outer edge and one or two on the inner, and about eight on the scutellum, two post-median and more central, and six (three, three) along the sides.

Each half of the prosternum bears numerous short bristles; the prepectus small, wedge-shaped and fused (?) with pleurae. The surface of the mesosternum and mesopleurae smooth, with striate pattern and only a few weak scattered hairs, except on the anterior third of the pleurae, which are covered with short appressed white bristles. The propodeon takes the form of two smooth triangular sclerites, narrowly united. There is some roughness below the oval, laterally-directed spiracles, and about the mid line. The pleurae are covered with many moderately long bristles.

*Wings*: *fore wings*, length: breadth, 5:2. Submarginal: marginal: radius: post-marginal, 10:11:2:5. End of radius triangular, with four separated cells (fig. 4, 7). Length, 1.8 mm.; breadth, .68 mm. The submarginal bears up to its junction with the marginal, seven to eight bristles, and parallel to this row are numerous minute hairs on the submarginal cell. The apex of this cell carries below sixteen to eighteen black recurved strong bristles of moderate length, crossing with the bunch of short spines at and on the junction of the veins. These spines are the heaviest units of the chaetotaxy. Similar short thick bristles occur on all the infuscated areas of the wings, except towards the apex. The scattered black bristles round the clear median band are heavier, but not structurally different from the brown ones elsewhere. Within the area subtended by the submarginal the chaetotaxy inclines parallel to the radius; beneath the marginal the bristles are at right angles to the radius; elsewhere the pubescence is erect or sub-erect. *Hind wings* over three times as long as broad. Submarginal: marginal, 5:8. Posterior cilia sparse; hairs of the disk short, longer near the apex. Marginal cell open to the hooks, with numerous bristles over the entire length. Length, 1.3 mm.; breadth, .4 mm.

*Legs*: unless otherwise stated, any joint or aspect (*i.e.*, posterior or anterior) of a joint is covered with evenly spread, often close, subequal short bristles. *Fore legs* with the coxae large, hardly deeper than wide, broadly attached to the sternum; apical collar narrow, anterior surface reticulate; posterior surface bare, except at outer apical angle, where a patch of bristles occurs, the more distal stronger; above the patch (*i.e.*, basally) the surface is smooth, reticulate again posteriorly. Trochanter long and narrow (two-thirds of the coxa), the upper anterior two-thirds bare. Femur not swollen, medianly a little decurved, reticulation moderate and drawn out; numerous short bristles along the entire dorsal edge, and narrowly on the anterior face (the latter bristles ceasing towards the base), the

lowermost bristles longer, forming a row parallel to the dorsal edge on apical half of tibia and then sloping gradually to the lower basal angle; on the ventral third of the anterior aspect, there is a subventral row (seven to eight) of scattered bristles, and many more below, more closely set, so that twelve to fourteen appear on the ventral edge itself. Mid anterior aspect of tibia bare; upper apical angle strongly chitinated, with two short peg-like spines; ventral apical spur five-sevenths of first tarsal joint; anterior apical comb of seven to eight spines, confined to the ventral half; one or two of the posterior subapical median bristles much stouter. First tarsal joint ventrally concave; antero-ventral edge with a closely set comb of twenty-five spines, while on the postero-ventral edge are eight to ten stouter spines, wider apart; proportions of tarsal joints and claw, 70 : 50 : 35 : 30 : 40+20. *Mid legs* with the coxa longer than broad (9 : 7), oblong, externally bare and weakly reticulate; on inside, near the trochanters, an oval patch of minute bristles (about forty) and one or two longer bristles at or near the edges. Trochanter quadrate (6 : 5), with a patch of bristles above and a transverse row of four longer bristles below. Femur depressed, gradually expanded from base to apex, bare below, except for a median basal row of about six bristles, which ends just beyond the commencement of the median dorsal dark streak (see colour notes); apically the femur extends in a flattened edge on each side of the tibia. Tibia apically a little expanded from beyond one-half; four to six peg-like spines on anterior apical angle, one stronger than the others; the posterior spine heavy, and as long as the first tarsal joint. The first tarsal joint bears on each side ventrally eleven to thirteen heavy spines, the second four to six, the third one to two, the fourth one; when these plantar edges are unequally armed, the anterior has the fewer spines; the proportions of the tarsal joints are, 65 : 55 : 40 : 35 : 50+15. *Hind legs* with numerous bristles on the outer anterior two-thirds of the coxa, two subapical on the median ridge much longer. Femur posteriorly almost bare, save for a submedian row (fifteen to sixteen) of bristles. Tibia with the posterior apical comb of about twelve spines completely transverse; the spur one-third of the first tarsal joint; the posterior subapical spines somewhat stout. Proportions of tarsal joints, 120 : 65 : 45 : 40 : 50+20.

*Abdomen*: On drying after immersion in spirit (in which the hind edges of the tergites are nearly invisible) the abdomen shrinks considerably and its true shape becomes debatable. In life it is probably broader on the whole, and widest more posteriorly than in Mr. Terzi's carefully executed figure. The apparent length of the tergites indicated are, through overlapping, somewhat different from the proportions of the same sclerites dissected off and measured in balsam. First and second tergites weak, almost membranous; the first most deeply incised, the succeeding tergites merely sinuate. Tergites 1 to 5 bare medianly, save for a transverse median row of seven to eight very short bristles, which are not developed on 1 and 2. On the pleural flaps, tergite 1 bears a patch of bristles anteriorly and a short row behind; tergite 2 has only a few posterior bristles at the sides; all the overlaps of tergites 3 to 5 are covered with closely set, short bristles. The posterior two-thirds of tergite 6, and all of tergite 7, covered with bristles. The spiracle is minute and circular, the stylet oval, with four long bristles. Sternites 1 to 5 medianly more or less membranous, and posteriorly incised. Sternite 1 bare; 2 to 4 with a posterior row of about twelve bristles, and other shorter ones in front;



sternite 5 medianly deeply cleft, and where not overlapped by the tergite, entirely covered with short bristles. The ovipositor does not extend beyond the non-projecting sheath; the fixed base of the sheath is twice as long as the free portion; the apical one-twelfth of the ovipositor is serrate, the teeth being not opposite, but developed from the sides alternately. *Length*, about  $2\frac{3}{4}$  mm.; alar expanse, over  $4\frac{1}{4}$  mm.

♂. Prevailing blackish, with unclouded wings. *Head*: eyes as in ♀, genae and frons brilliant, very dark metallic blue, greenish between the scapes; on the vertex the latter tinge prevails. Antennae dark, with metallic green reflections, only the ventral edge of the scape narrowly non-metallic pale brown. *Thorax*: pro- and meso-nota (up to the suture) metallic blue green, with a bronzy tint on the mid lobe. Axillae and scutellum darker, duller, with dim coppery reflections. *Legs*: fore coxae metallic blue-black, mid and hind coxae purplish black. All femora and hind tibiae blackish. All trochanters, fore and mid tibiae (the latter obscurely) pale. Tarsi pale, with last joints darker. *Propodeon* and *abdomen* dark blue to violet, metallic blue reflections on former, the latter only faintly metallic or non-metallic.

*Head*: eyes relatively further apart on the vertex than in the ♀; the distance in proportion to the diameter of the eye from in front is 5:3; at the lower angle the proportion is 5:2. The scrobes are set higher up in this sex, nearly clear of the base line of the eyes. The margins of the depressed triangle in which the scapes lie, and also the apical median keel, are not distinctly defined—the outlines being rather rounded. There is a whitish pubescence above the scrobes. Mouth-parts as in the ♀, but the last joint of the maxillary palpus relatively shorter.

*Antennae* (fig. 4, 1) eleven-jointed, differing from those of the ♀ in that the club is unsegmented and the first funicular is a ring joint (fig. 4, 2). Scape about three-and-a-half times as long as broad; rather wide near the base and expanded distally; considerably excavated for the pedicel (one-third). Pedicel narrow (7:4). Seven normally developed funicular joints, besides the ring joint, all longer than broad. The antenna expands so gradually that the club only slightly exceeds (8:7) the tenth joint, and is not more than half as broad again (3:2) as the first normal funicular joint (fourth). On the inside of the funicle and club are numerous sensoria, about seventy on the club alone. Proportions of last eight antennal joints, 20:25:30:27:27:24:24, and club, 87.

*Thorax*: *pronotum* hardly visible from above, largely concealed behind the swollen occiput; almost perpendicular, not horizontally porrect as in the ♀; distinctly reticulate, with scattered hairs all over and an irregular posterior row of six bristles on each protergite. *Mesonotum* with complete furrows meeting the suture at the middle of the axillae. Basal scutellar abscissa narrow, barely half that of axilla. Mid and lateral lobes with a regular raised reticulation and numerous short, evenly distributed hairs. Middle of scutellum and inner sides of axillae with the same pattern as the mid lobe, etc., but the outer sides of the axillae and scutellum have a striate reticulate pattern. Axilla with eight to ten bristles. Scutellum with many more hairs than the ♀ (twenty to twenty-four in all), besides the two clear median pustules which may not be setigerous. *Metanotum* normal, all three parts reticulate, the post-scutellum coarsely so; mesophragma long and not reduced as in the ♀. Mesopleurae with a distinct furrow. A quadrate sclerite (? episternite) distinguishable below the wings. Mesosternum posteriorly with an irregular median double,

and a lateral single, row of hairs reaching to about one-half. Sternum and pleurae smooth or faintly reticulate, with a few inconspicuous hairs. (In the ♀ this region has a strong, silvery pubescence). Prepectus large, coarsely reticulate. *Propodeon* normal, spiracle more roundly oval than in the ♀. Pleurae below spiracle boldly reticulate, with a few weak hairs, not forming a conspicuous patch as in the ♀.

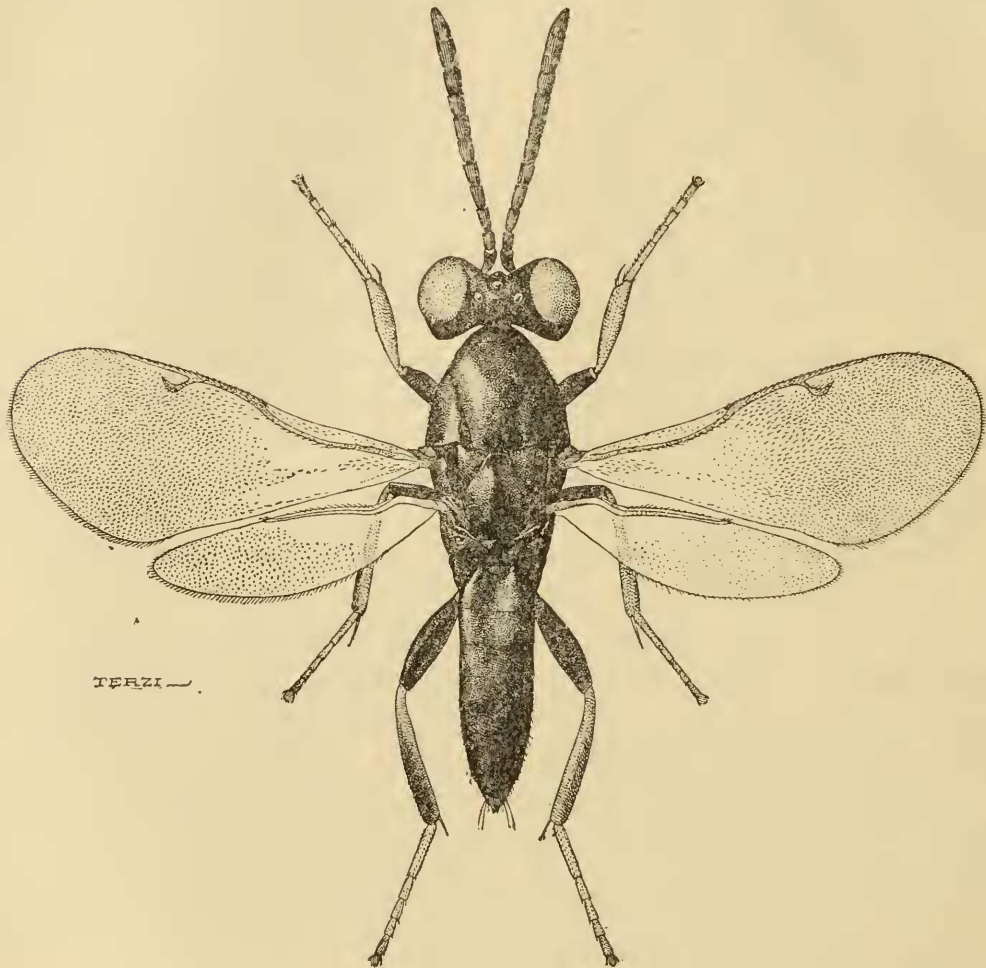


Fig. 5. *Anastatus viridiceps*, Waterston, sp. n., ♂.

*Wings*: *fore wings* rather more than twice as long as broad, with a scattered pubescence of equal calibre, wanting only below the junction of marginal and submarginal veins. Submarginal: marginal: radius: post-marginal, 5:3:1:2. Length, 1.3 mm.; breadth, .6 mm. The submarginal carries ten to twelve bristles. In the cell a double row of short bristles, those at the apex not markedly stronger nor crossing with others on marginal vein. *Hind wings* similar to those of ♀; three times as long as broad. Submarginal to marginal, 3:2. Length, .9 mm.; breadth, .3 mm.

*Legs*: *fore legs* with the femur a little swollen, not decurved, both dorsal and ventral edges convex; chaetotaxy essentially as in the ♀, but the bristles are longer and form ventrally a distinct row (seven to eight); on the anterior face the bristles descend to one-half, reducing the bare area to a streak; two short heavy spines at upper apical angle, and a transverse comb of six spines. Only the anterior edge



of first tarsus excavated, with a comb of sixteen to eighteen spines; the straight posterior edge bears seven to eight; proportions of tarsal joints, 50:30:25:20:30+20. *Mid leg* lacking the internal oval patch of spines on the coxa. Femur and tibia normal (*i.e.*, antero-posteriorly compressed), femur not expanded, posteriorly smooth and bare, except for three bristles in a median line from the base, the last standing at about one-half. Tibia without upper apical short peg like spines; one apical bristle below the normal spur is strong. Tarsus normal, without heavy spines or thickening of any joint; proportions of tarsal joints, 55:35:25:20:30+15. *Hind legs* with the tibia slightly flattened but not apically expanded, no upper apical heavy spines; posterior comb with fourteen to fifteen spines. Proportions of tarsal joints, 65:37:28:22:30+20.

*Abdomen* like that of the ♀, depressed above and carinate below; all tergites equally sclerosed, and none posteriorly emarginate. The surface smooth along the median line, but the pattern reappearing at the sides. Only one posterior row of bristles on tergites 1 (three, three) and 2 (six, six); on 3 and 6 there is a complete double row of bristles, and one or two more at the sides; tergite 7 has one or two hairs outside the stylet and about fourteen (seven, seven) between; tergites 6 and 7 are also shagreened at the sides, with numerous microscopic scales. Tergites 2 to 7 are equal, and 1 is half as long again as the others. The stylet bears one long and three or four shorter bristles. Length, about 1.8 mm.; alar expanse, 3-3½ mm.

NORTHERN RHODESIA: Kashitu, 3♂♂, 6 ♀♀, bred from puparium of *Glossina morsitans* (Ll. Lloyd).

*Type*—a ♀.

The *Glossina* puparium was taken on 11.xi.14, and the parasites emerged four days later. Besides the above complete examples 2 ♂♂ and 2 ♀♀ were enclosed in a fragmentary condition, these having been kept alive by the collector in an attempt to propagate the species. In his covering letter (30.xii.14) Mr. Lloyd remarks that "in all, 9 ♀♀ and 6 ♂♂ emerged through a small round hole on the dorsal surface, a little in front of the anal cap; . . . copulation occurred shortly after emergence and the males lived only a day or so." Considering the care taken in rearing these parasites, the broken condition (noted by Mr. Lloyd before despatch) of four examples which were kept alive for breeding purposes, seemed noteworthy. I have since seen ♂♂ of another *Anastatus* when confined in a tube with a ♀ bite one another so severely that a leg was partially torn off.

#### Family EULOPHIDAE.

#### Genus SYNTOMOSPHYRUM, Först.

#### **Syntosmophyrum glossinae**, Wtrst.

*S. glossinae*, Waterston, Bull. Ent. Res. v, pt. 4, p. 365, figs. 14-16 (1915).

A tube full of fragments of this species has been received, concerning which Mr. Eminson writes, "about thirty specimens found on August 21st, 1914, which had emerged from a single pupa of *G. morsitans*. As will be seen, the parasites emerged through a minute hole in the pupa-case. Since that date three specimens of pupa-cases similarly attacked have been found. The pupa was collected on June 1st within a mile of the Kafue R., near Mwengwa."

This is a very slightly smaller form than the type, which was bred from *Glossina palpalis*, the abdomen (♀) being entirely dark and the second mid tarsal joint in many examples about one-seventh longer. In all other respects the agreement is complete. This is the material referred to in Bull. Ent. Res., v, p. 382 (1915).

The nature of the relation of these three Chalcidoids to *Glossina morsitans* is not yet determinable. The *Anastatus* is probably a true parasite and therefore a beneficial insect ; of the *Stomatoceras* nothing can be affirmed. The *Syntomosphyrum* belongs to a group containing both parasites and hyperparasites, and may be either a useful controller of the fly, or a useless destroyer of a natural enemy.

[Including the foregoing species, we now know of seven insects which are parasitic on *Glossina*, five being Hymenoptera and two Diptera. The following is a list of them :—

Parasite.	Host.	Locality.	Collector.
MUTILLIDAE— <i>Mutilla glossinae</i> , Turn. ..	<i>G. morsitans</i>	N. Rhodesia	R. A. F. Eminson.
PROCTOTRUPIDAE— <i>Conostigmus rodhaini</i> , Beq.	<i>G. palpalis</i>	K a t a n g a , Belgian Congo	J. Bequaert.
CHALCIDIDAE— <i>Stomatoceras micans</i> , Wtst.	<i>G. morsitans</i>	N. Rhodesia	R. A. F. Eminson.
ENCYRTIDAE— <i>Anastatus viridiceps</i> , Wtst.	„	„	Ll. Lloyd.
EULOPHIDAE— <i>Syntomosphyrum glossinae</i> , Wtst.	<i>G. palpalis</i> <i>G. morsitans</i>	Uganda .. N. Rhodesia	Dr. G. D. H. Carpenter. R. A. F. Eminson.
BOMBYLIIDAE— <i>Thyridanthrax abruptus</i> , Lw. <i>Villa lloydi</i> , Aust. .. ..	<i>G. morsitans</i> „	S. Rhodesia N. Rhodesia	R. W. Jack. Ll. Lloyd.

—ED.]